M 11601

Reg. No. : .....

Name : .....

I Semester B.A./B.Sc./B.Com./B.B.A./B.B.A.T.T.M./B.B.M./B.C.A./B.S.W. Degree
(CCSS – Reg./Supple./Improv.) Examination, November 2011
CORE COURSE IN MATHEMATICS
1B01 MAT : Methodology and Perspectives of Sciences

Time: 3 Hours Max. Weightage : 30

1. Fill in the blanks :
   a) Scientific papers generally follow the _____ approach.
   b) The negation of the statement "Kannur is in India" is _____
   c) By De Morgan's law $\neg (p \vee q) =$ _____
   d) A Counter example for the statement $\forall x \in \mathbb{R}, x^2 \geq x$ is _____ **(Weightage 1)**

Answer **any 7** from the following (Weightage **1 each**)

2. What distinguishes science from other approaches to gaining knowledge ?
3. Define and distinguish between induction and deduction.
4. Define and distinguish between objectivity and subjectivity.
5. Why are notebooks valuable in science ?
6. Define disjunction and negation. Also draw their truth tables.
7. Write the contra positive and inverse of the statement "If John works, he will earn money".
8. Determine the truth value of each of the following statements :
   a) 3 + 2 =5 and Kannur is in Karnataka
   b) 3 + 2 = 5 and Kannur is in Kerala.
9. Find the truth table for $p \vee \neg q$.
10. Define tautology and give an example.
11. Determine the contra positive of each statement given below :
    a) If John a is poet, then he is poor.
    b) Only if Marc studies will he pass the test. **(Weightage 7×1=7)**

P.T.O.

Answer **any 7** from the following (Weightage **3 each**) :

12. Compare and contrast basic and applied research.

13. Compare and contrast between relativism and realism.

14. Write briefly about the different thought processes used in developing hypotheses ?

15. Discuss hardware models.

16. Why is critical thinking so important for the progress of science ?

17. Write down the truth table for the following and state whether it is a tautology or not :

    $(p \vee q) \wedge (\neg q) \rightarrow p \vee \neg q$.

18. Show that $p \leftrightarrow \neg q$ does not logically imply $p \rightarrow q$.

19. Verify the proposition $(p \wedge q) \wedge \neg(p \vee q)$ is a contradiction.

20. Write down the truth table for the following compound statement and state whether it is a tautology or not :

    $(p \rightarrow q) \leftrightarrow (\neg p \vee q)$

21. Decide whether each of the following is true or false :

    a) $p \rightarrow p \wedge q$ b) $p \rightarrow p \vee q$

22. When do you say a proposition P is said to logically imply another proposition Q ? Show that $p \wedge q$ logically implies $p \leftrightarrow q$. **(Weightage 7×2=14)**

Answer **any two** from the following (Weightage **4 each**) :

23. Compare and contrast mathematical methods and scientific methods.

24. Write an essay on depositories of scientific information, primary, secondary and digital sources.

25. Test the validity of the following argument :

    If milk is black, then every crow is white.

    If every cow is white then it has four legs.

    If every crow has four legs then every buffalo is white and brisk.

    The milk is black.

    Therefore, the buffalo is white.